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PESTICIDE USE AND CONTROL IN CANADA

Revised to 1982
Published 1984

Canada

PESTICIDE USE AND CONTROL IN CANADA

Part I **Regulatory Aspects**

Part II **Environmental and Human Health Aspects**

Agriculture Canada
Environment Canada
Fisheries and Oceans Canada
Health and Welfare Canada

Revised to 1982
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ABSTRACT

"Pesticide Use and Control in Canada" outlines the federal legislation, the regulatory procedures and directives, and the committees that relate to the management of pesticides. The Pest Control Products Act, administered by Agriculture Canada, is the principal federal law that governs the sale and use of pesticides in Canada. Details of the pesticide registration review process, the kinds of scientific information required for evaluation and the areas of concern of the principal agencies involved are given in the paper. Research and monitoring programs carried out by the federal government to determine and assess environmental and human health effects resulting from the use of pesticides as well as surveillance activities are discussed. Contingency plans in case of accidents and information exchange and education programs related to pesticides are discussed briefly.

RÉSUMÉ

L'utilisation et la réglementation des pesticides au Canada résume la législation fédérale, les mesures réglementaires et des directives se rapportant aux pesticides. On y trouve aussi la description des comités qui administrent ce secteur. La Loi sur les produits antiparasitaires, appliquée par Agriculture Canada, est le principal instrument juridique fédéral régissant la vente et l'utilisation des pesticides. Le document analyse aussi le processus d'examen, l'enregistrement des pesticides, la nature des renseignements scientifiques nécessaires à une évaluation ainsi que le champ de compétence des principaux organismes concernés. L'étude commente les activités de recherche et de surveillance qu'accomplit le gouvernement fédéral pour déterminer et évaluer les répercussions des pesticides sur l'environnement et la santé humaine. On y commente également de façon sommaire les mesures d'urgence s'appliquant en cas d'accidents, de même que l'échange de renseignements et les programmes éducatifs se rapportant aux pesticides.

FOREWORD

The original paper on pesticide use and control in Canada was prepared to provide background information for discussion on this subject at the meeting of the Canadian Council of Resource and Environment Ministers (CCREM) held at Saskatoon, Saskatchewan, June 1 and 2, 1977. That paper was published in 1978. It was revised and presented in draft form (because of time limitations) for use as a background document at the CCREM meeting held at Ottawa, Ontario, on September 29, 30 and October 1, 1981. After that meeting, additional changes were made in the paper, mainly to expand and clarify information in some subject areas. The input for these revisions was received from the various contributors late in 1981 and in 1982. Other changes in the form of corrections and further clarifications were made in 1983 and in 1984 in final preparation for publication. The effective date of revision, however, is 1982.

The paper was prepared and revised through the collaboration of the federal Departments of Agriculture, Environment, Fisheries and Oceans, and National Health and Welfare. The input to the original paper was coordinated by Mr. E.R. Houghton, Control Products Section (now the Pesticides Division), Agriculture Canada, and Dr. H.S. Thompson, Commercial Chemicals Branch, Environment Canada. The revision was coordinated by Dr. Thompson.

The primary contributors to the paper were:

Original	Revised
Agriculture Canada	Agriculture Canada
E.R. Houghton D.R. Phillips	L. McClelland R.M. Prentice Jean M. Stalker Janet Taylor
Fisheries and Environment Canada	Environment Canada
N.Y. Khan P.C. Nigan D.B. Peakall H.S. Thompson	D.J. Forsyth G.W. Green H.S. Thompson
	Fisheries and Oceans Canada
	N.Y. Khan
Health and Welfare Canada	Health and Welfare Canada
Claire A. Franklin	P.R. Bennett Claire A. Franklin

The regional offices of the former Department of Fisheries and the Environment played an important role in the production of the original (1977) paper by obtaining from the provincial environmental authorities specific concerns pertaining to the subject. These offices, now of Environment Canada, and Fisheries and Oceans Canada, also contributed to the revision of the paper by providing comments on departmental pesticide activities, especially those concerning the regions.

Many others, including A.M. Drummond, National Research Council, G.M. Cornwall, Environmental Protection Service, Environment Canada, A.R. Davis and M. Forbes, Inland Waters Directorate, Environment Canada, and the Chairman or Secretaries of the Expert Committees of Agriculture Canada, provided information for this revision of the paper.

The contributions of all individuals in the production of this paper is appreciated and gratefully acknowledged.

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PART I - REGULATORY ASPECTS

I.1 INTRODUCTION

In Canada, more than 100 laws may be construed as having some regulatory authority over the sale, the use or the consequence of use of pesticides. This number includes legislation adopted by the federal, provincial and municipal governments, but only a few of these laws specifically address pesticides.

The principal federal law that governs the sale and use of pesticides is the Pest Control Products Act (P.C.P. Act). This paper provides information on the structure, operation and philosophy of the P.C.P. Act, its Regulations, and regulatory directives issued under that authority.

The provinces and the territories may also exercise additional regulation over pesticides through appropriate provincial or territorial legislation. The adoption of laws to regulate pesticides by the provinces and territories results from the recognition of a need for management of this commodity group to meet local concerns and/or conditions.

Pesticides were first brought under federal regulatory control in 1927 by means of an Act to Regulate the Sale and Inspection of Agricultural Economic Poisons. This law was superseded in 1939 by a Pest Control Products Act. The primary intent of the P.C.P. Act (1939) and its predecessor was to prevent misrepresentation of products sold for the control of pests and to prevent the sale of unduly harmful chemicals for these purposes. These laws were principally labelling authorities that determined the label requirements under which pest control products could be imported or offered for sale. This relatively simple regulatory authority served the public purposes quite adequately until the advent of synthesized organic pesticides which became available about 1945 at the close of World War II. It was recognized in the mid 1960's that a more sophisticated law was needed to manage what had become a highly complex and essential commodity group - modern pesticides. In 1969 a revised Pest Control Products Act was passed by Parliament and brought into force by the adoption of Regulations in November 1972.

I.2 PEST CONTROL PRODUCTS ACT

The revised Pest Control Products Act provides broader authorities and extends the definition of subject products in order to cope with the ever widening range of activities and complex technologies involved in the control of pests.

The intent and philosophy of the P.C.P. Act is expressed as follows, "No person shall manufacture, store, display, distribute or use any control product (pesticide) under unsafe conditions" (Section 3(1) P.C.P. Act). The remaining elements of the Act and the Regulations written thereunder are oriented to provide authority to achieve that intent. Underlying the Regulations and procedures elaborated under that authority is a conscious attempt to involve all participants in the development, sale, use and regulation of pesticides in the decision making process to assure safe and effective use. In this respect, the P.C.P. Act, Regulations and directives issued thereunder are a system of management that carries with it persuasive elements under law and a capability to bring violators to task.

The Pest Control Products Act is the primary federal regulatory instrument by which the disciplinary and regulatory interests of the governments of Canada can be recognized. It follows that there must be close working relationships among federal and provincial agencies in the operation of this law. This close working relationship is best illustrated by the evaluation process inherent in the operational procedures that have evolved over many years. It is important to note other pesticide legislation, however, with which the P.C.P. Act is coordinated.

I.3 OTHER FEDERAL ACTS

In addition to the P.C.P. Act, a number of other federal acts have implications in regulating and limiting the use of pesticides in special situations. These include:

I.3.1 Food and Drugs Act

The Food and Drugs Act, administered by Health and Welfare Canada, ensures that foods offered for sale to Canadians are safe, fit for consumption, clean and unadulterated. This Act prohibits the sale of food that is adulterated or has in or upon it any poisonous or harmful substance. Under the authority of the Food and Drug Regulations, agricultural chemicals are defined and include pesticides and plant growth regulators. In addition, Division 15 of these Regulations defines adulteration of food by agricultural chemicals and those exemptions which are listed in Table II in that Division.

A maximum residue limit, expressed in parts per million and listed in Table II, Division 15 of the Food and Drug Regulations, is the quantitative limit of an agricultural chemical that may occur on a specified food and that would not be considered to be in violation of the Food and Drugs Act. The maximum residue limit established for a pesticide is determined by the amounts likely to remain in food at point of first sale (e.g. at harvest of a crop, slaughter of an animal, importation of a foreign food) after use in accordance with registered uses or good agricultural practice. Such residue limits are only accepted providing that the total consumption of residues from all food uses is considered to be safe for human consumption over an entire lifetime. The residues of many modern pesticides degrade rather quickly so that the residue levels on food in the supermarket, or in meals consumed in restaurants, are generally much less than those permitted by regulation.

I.3.2 Environmental Contaminants Act

Under the Environmental Contaminants Act, the Ministers of the Environment, and National Health and Welfare can demand specific data relating to use, sales, manufacture or import of a chemical, and conduct reviews in respect to its environmental or human health hazard. On the basis of these reviews, the Governor-in-Council can take necessary actions to regulate or limit the use or release to the environment of a chemical if regulations to control the apprehended hazard posed by a substance are not formulated under other legislation. Thus, the Environmental Contaminants Act is essentially a residual power and it is designed to operate as a backup to other federal and provincial laws. If and when a pesticide use is identified as a significant source of environmental

pollution, the Pest Control Products Act would normally be involved; the Environmental Contaminants Act would be used where the P.C.P. Act did not have adequate powers.

I.3.3 Fisheries Act

The Fisheries Act with its amendments issued in 1970 and 1977 provides for the protection of the fishery resource. Section 31 prohibits the destruction or the harmful alteration of fish habitats and Sections 33-33.4 (the pollution provisions) prohibit the deposit of substances which are deleterious to fish or to man's use of fish. These prohibitions, together with authorities enabling the Minister of Fisheries and Oceans to request plans, procedures, schedules, analyses, etc. (Section 33.1) when any undertaking results in or is likely to result in the deposit of a deleterious substance or disruption of fish habitat, have been used to ensure that significant pesticide applications, such as forest spraying operations, have minimum impact on the fishery resource. Environment Canada administers the pollution provisions of the Act cooperatively with the Department of Fisheries and Oceans.

I.3.4 The Migratory Birds Convention Act

This Act is administered by Environment Canada and is similar to the Fisheries Act in its scope. Its regulations prohibit the deposit of oil, oil wastes, or any other substances harmful to migratory birds in any waters or any area frequented by migratory birds.

I.3.5 The Ocean Dumping Control Act

The Ocean Dumping Control Act, administered by Environment Canada, was designed to assist Canada in protecting its fisheries and recreational activities from pollution resulting from dumping in marine waters. The major provision of the Act is that no person shall dump except in accordance with the terms and conditions of a permit. Under the authority of this Act, disposal of certain substances (e.g., organohalogen compounds, mercury and cadmium compounds) is prohibited except in special circumstances (Schedule I). A number of other substances including all pesticides and their by-products not included in Schedule I are classified as restricted and special care is required in releasing these substances to the marine environment (Schedule II).

I.3.6 Canada Water Act

The administration of the Canada Water Act is the responsibility of the federal Department of the Environment. It provides for joint comprehensive planning for

the management of water resources that are of national significance. In most of the planning studies conducted to date under federal-provincial agreements, water quality has been a major concern. Recommendations from such studies may be implemented by the federal or provincial governments acting alone, or where appropriate, through a federal-provincial agreement.

I.3.7 The Northern Inland Waters Act and the Arctic Waters Pollution Prevention Act

These Acts are administered by the federal Department of Indian and Northern Affairs, and relate to the maintenance of water quality and to the prohibition of discharge into designated waters of any substance that would degrade or alter the quality of those waters to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man.

I.3.8 The Transportation of Dangerous Goods Act

This Act is administered by Transport Canada. The major provision is that no person shall handle for transport or transport dangerous goods unless all the prescribed safety procedures applicable thereto have been complied with, and all the containers and vehicles used therefor comply with all the prescribed safety standards applicable thereto. All dangerous goods or substances, including pesticides, known to be transported in Canada will be categorized according to the nature of their human and environmental hazard during their transport. The Departments of the Environment, and National Health and Welfare are involved in the evaluation of materials for their environmental and human health hazards. Regulations pursuant to this Act are in the process of being promulgated.

I.4 REGISTRATION OF PEST CONTROL PRODUCTS

The Pest Control Products Act provides authority to regulate not only pesticides used in agriculture, but also those used in forestry, industry, public health, and domestic situations.

The conditions under which a product may be sold and the purposes for which it may be used are established under the authority of the P.C.P. Act. These conditions of sale and use are set forth in the register for each control product and are determined by an evaluation process (Section 13(2) P.C.P. Regulations). An application made under the Act for the registration of a pest control product must be accompanied by scientific information sufficient to facilitate evaluation of the product with respect to merit and safety (Section 4(1) P.C.P. Act and Section 9(1) P.C.P. Act Regulations). Copies of the supporting scientific data are provided, with a request for review and comment, to consulting agencies in Agriculture Canada, Environment Canada, Fisheries and Oceans Canada, and Health and Welfare Canada. The consulting agencies of these departments include the Research Branch and Health of Animals Directorate, Agriculture Canada; the Contaminants Control Branch (renamed the Commercial Chemicals Branch, April 1, 1983), Wildlife Research and Interpretation Branch, and the Forest Pest Management Institute, Environment Canada; the Fish Habitat Management Branch, Fisheries and Oceans Canada; and the Bureaus of Chemical Safety and of Chemical Hazards, Health and Welfare Canada. Depending upon the proposed use of the product, other agencies may also be asked for an expert opinion from time to time. Upon reviewing the submitted data together with the consulting agencies' review comments, evaluation officers in the Pesticides Division of Agriculture Canada communicate with the applicant with respect to his product and whether or not it meets the requirements of the Act and Regulations.

It is not unusual that despite the submission of comprehensive data with respect to any given product, its registration for some or all uses may be refused. There is no publication mechanism to document such cases, since it is a matter of negotiation between the registrant and regulatory officials.

Registered products are subject to reevaluation in the light of new information during the life of the product (Section 20 P.C.P. Regulations). Once a product has been registered and becomes established in pest control practices in agriculture or elsewhere, the scope of any reevaluation process is expanded to include provincial agencies. Reevaluation involving a long-registered product is a longer and more complex procedure because of the essential participation of provincial advisers.

Registration is by far the most readily recognized regulatory status accorded pesticides under the Act, but it is not the only regulatory procedure through which pesticides are made available to the public. It will be useful to describe these procedures as provided in the structure of the Pest Control Products Regulations.

1.4.1 Pesticides Used for Research Purposes

Small quantities of unregistered pesticide product may be imported or made available to recognized researchers as long as the work is confined to the research premises of the employing agency (Section 5(b) P.C.P. Regulations). Thus research stations and laboratories of government departments or private companies are not encumbered by permit requirements under the P.C.P. Act. The Research Branch of Agriculture Canada, however, operates a system whereby new compounds are documented and cleared for research purposes within that Branch.

Pesticide research conducted off the premises of the research agency must be documented and approved by the Director General of the Plant Health and Plant Products Directorate who is responsible for the administration of the P.C.P. Act (Section 5(b) P.C.P. Regulations). Usually such work involves pesticides that have already been subjected to considerable study but additional information is needed on their use under practical conditions. These tests may be termed field trials.

Field trial research approval involving unregistered pesticides on food crops requires that the crop be destroyed or otherwise prevented from entry into normal food marketing channels. Occasionally such crops may be allowed to enter food marketing channels where this has been agreed to by officials of the Health Protection Branch of Health and Welfare Canada, in respect to the Food and Drugs Act.

Small-scale field research trials involving unregistered pesticides on non-food crops, or in other research situations such as forestry, are essential to generate the field efficacy and environmental impact data required for registration assessment. Such trials are approved when the consulting agencies concerned (Section 1.4) are satisfied that use of the pesticide in such trials will not result in undue risk to human health or environmental quality.

1.4.2 Pesticides in Products whose Primary Purpose is other than Pest Control

Control by means of registration under the P.C.P. Act is not appropriate for some products. Fertilizers that contain a herbicide or an insecticide are registered under the Fertilizers Act but must conform to the requirements of the P.C.P. Act. Although bleaches and chlorinated powdered cleaners that are represented as disinfectants and

other similar examples of pesticide use are subject to evaluation under the P.C.P. Act, they are not required to be registered. Such products found, upon evaluation, to require regulatory measures to assure compliance with the provisions of the Act are prescribed in Schedule II of the Regulations (Section 5(c) P.C.P. Regulations). Schedule II provides for characterization of the product together with conditions of formulation, use and labelling that must be met when such products are offered for sale.

I.4.3 Pest Control Products that are Devices

The definition of a pest control product includes any device that is used directly or indirectly in the control of any pest. Because of the multiplicity of devices used in conjunction with other pesticides or alone, this class of product is provisionally exempted from the P.C.P. Act (Section 3(b) P.C.P. Regulations). Any device found, upon evaluation, to require regulatory control to assure compliance with the provisions of the Act, may be prescribed in Schedule I of the Regulations. Schedule I provides for the characterization of the device, thereby rendering all such products subject to registration and the applicable regulations respecting labelling. A number of devices are now characterized in Schedule I, including electronic devices sold as a means to attract and destroy flying insects.

The purpose of Schedule I is to permit the regulation of pest control devices, where it is evident that effectiveness and safety are dependent upon close regulation of such products. There is no legal compulsion, however, to regulate devices that under ordinary circumstances do not require control to ensure safety.

I.5 CLASSIFICATION OF PEST CONTROL PRODUCTS

Registration is required for pesticides that are sold generally to the public and it is the most visible means of product control. The registration procedure carries with it a number of subsystems of regulatory control that are important in the overall management of this commodity group.

The labelling requirements for registered pesticides are both detailed and comprehensive. Among the requirements is product classification, consisting of three classes designated as Domestic, Commercial and Restricted (Section 26(2) P.C.P. Regulations). The class designation assigned to each product must be shown clearly on the main panel of the label. Classification is dependent upon toxicological and environmental parameters and is intended to confine products to channels of trade in accordance with the inherent product risk and the capability of the user to avoid undue hazard to himself, third parties and environmental quality.

The toxicological parameters used in the classification scheme include acute oral LD_{50}*, acute dermal LD_{50}, inhalation hazard, eye irritation potential and chronic effects. Other parameters include environmental effects, package size and location of use, e.g., aquatic and forestry situations. Details of the classification scheme are presented in "Registration Guidelines" published by the Pesticides Division, Agriculture Canada, K. W. Neatby Building, Ottawa, Ontario, K1A 0C6.

I.5.1 Domestic Class

For control products to be eligible for sale for non-commercial purposes in and around the home and to be classed as Domestic, rather stringent safety standards must be met. Toxicological criteria for this class of products are such that inadvertent exposure is unlikely to result in severe effects. Environmental consequences of the use of pesticides in the Domestic class must be slight and the disposal of the container and product by means of regular garbage collection must be without appreciable risk. Despite these rather stringent requirements the spectrum of products available for homeowner use is considered to be adequate for pest situations found in and around the home. While the P.C.P. Regulations do not specify the kinds of sales outlets through which Domestic class products may be marketed, some provinces control this marketing aspect by licensing requirements for dealers.

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* LD_{50} is the dose lethal to 50% of the test organisms.

I.5.2 Commercial Class

Commercial class pest control products are registered for use in commercial operations such as agriculture, forestry, industry and similar situations. The toxicological parameters used to judge the eligibility of a pesticide for the Commercial class allow for the inclusion of more toxic products than in the Domestic class. It is expected that commercial users are better equipped and more knowledgeable in safe practices than the private user. Further, most poisonings occur with children as a result of imprudent storage of containers around the home; this situation does not normally occur in commercial operations.

I.5.3 Restricted Class

Restricted class pest control products are really commercial products for which several regulatory instructions or limitations have been imposed. There is a point where label instructions on storage, handling and use of a potentially hazardous product become inadequate to convey the need for unusual precautions to prevent detrimental effects to human health or environmental quality. The classification "Restricted" in itself alerts the purchaser and user, but in each case the nature of the restriction is printed on the product label. The onus for compliance with the described restriction falls upon the user or the person in whose charge the product is found.

It should be noted here that the evaluation process may result in refusal to register in the first instance (Section 18 P.C.P. Regulations) and this is not an uncommon result. Should registration be granted recognizing that risks are involved in the use of the product but that those risks can be alleviated by restrictive measures, then the product may be assigned to the Restricted class with the appropriate limitation on sale, distribution or use.

I.6 RESTRICTIONS ON PEST CONTROL PRODUCTS

A number of restrictions on pest control products are in use. These are determined by the characteristics of the product or its intended and registered use.

I.6.1 Storage and Display Restrictions.

I.6.1.1 Oral Toxicity. Products with formulations having an acute oral LD_{50} of 50 milligrams per kilogram (mg/kg) or less are classed as Restricted. The nature of a restriction statement is: "This product is to be stored and displayed apart from food and feed".

The purpose of this regulatory condition is to prevent the contamination of food or feed through poor or careless handling practices in the channels of trade. This restriction, however, imposes no constraint on the user.

I.6.1.2 Inhalation or Percutaneous Toxicity. Products having a dermal (percutaneous) LD_{50} of 100 mg/kg or less and fumigants are also classified as Restricted. The nature of the restriction statement is "This product is to be stored apart from lodging for humans, animal quarters, and normal work areas, to avoid inadvertent exposure".

I.6.2 Use Restrictions

I.6.2.1 Qualification of Users. Certain products are limited in use to persons who, by training or authority, are qualified to use them. One of the following statements must appear on the labels of products so restricted:

"For sale only to pest control operators, farmers and persons authorized in government approved pest control programs where the vendor maintains a record of sales including the name, address and signature of the purchaser together with the quantity of product purchased."

"For use only by, or under the supervision of, the Plant Quarantine Division, Agriculture Canada."

"For use only by, or under the supervision of, government agencies or pest control operators."

"For sale only to persons authorized in government pest control programs."

"For use only by, or under the supervision of, licensed veterinarians."

I.6.2.2 Use Limitations. Products registered for use in aquatic or forestry situations are classed as Restricted regardless of their toxicity. The reason for this arbitrary assignment is that generally both the aquatic and forestry environments are in a natural

state with a full complement of flora and fauna, some of which may be sensitive; good operating practice must therefore be ensured. Conversely, most agricultural situations involve greatly modified and simplified environments that can tolerate greater latitudes in pesticide use. The restriction statement required on the labels of products used in forest and aquatic situations is: "This product is to be used only in the manner authorized; consult local pesticide regulatory authorities about use permits which may be required".

Aquatic uses of pest control products are further regulated by specific requirements, such as a permit or a licence, under provincial or territorial legislation.

All provinces with significant forest pest control programs have legislation enabling them to carry out interdisciplinary reviews of the programs and to issue permits for them.

The foregoing paragraphs describe the special procedures that control certain uses of pesticides in the Restricted class prior to or during their application. It should be noted, however, that a legal constraint is placed upon all users of all pesticides to comply with the registered use directions on the label of the control product or with other regulatory documents that delineate acceptable use (Section 45(1) P.C.P. Regulations). This constraint is: "No person shall use a pest control product in a manner that is inconsistent with the directions and limitations respecting its use shown on the label". Any person who fails to comply with the registered label use directions and thereby creates an unsafe condition has violated the Act and is subject to prosecution.

I.7 CAUTIONARY LABELLING

In addition to the classification scheme for pest control products that is dependent upon toxicological and environmental parameters, there is a coordinated cautionary labelling scheme that is also dependent upon toxicological parameters. Cautionary labelling consists of a system of statements, signs and symbols that inform the purchaser and user of the nature and degree of hazard inherent in a particular product as well as of the measures to be taken to protect the user, by-standers and the environment.

The cautionary labelling scheme for pest control products is described in the "Registration Guidelines" referred to earlier. The scheme recognizes four levels of risk potential represented in descending order of hazard by the words "DANGER", "WARNING" and "CAUTION", with the fourth category requiring no designation. The cautionary words are accompanied by international traffic symbols, again in descending order, consisting of the octagon STOP SIGN, the diamond CAUTION SIGN, and the inverted triangular YIELD SIGN.

Within the encircling STOP, CAUTION, and YIELD signs is a symbol that indicates the kind of risk potential. Four kinds of risk are recognized: the skull and crossbones for poisoning by ingestion, dermal or inhalation routes; a flame symbol for flammability; an exploding sphere indicating explosivity; and a skeletonized hand symbolizing corrosivity.

For each product the appropriate complex of symbols and words is required to appear on the front panel of the pesticide label so as to be recognizable at some distance from the product, and readily discerned if the product is "out of place".

I.8 REGULATORY DIRECTIVES

The foregoing sections describe the principal regulatory structures embodied in the P.C.P. Act and the Regulations. A number of regulatory directives explain and interpret the Act and Regulations. These directives provide guidance to all participants in the management of pesticides on how compliance can be most easily achieved.

I.8.1 Memorandum to Registrants

This directive (See Annex I for examples) may be addressed to a single registrant or group of registrants as required, and usually seeks advice or comment from industry on proposed changes in the regulatory status of an active ingredient, or on the elaboration of new procedures, evaluation criteria or standards as they affect pest control products.

I.8.2 Trade Memorandum

The purpose of this directive (See Annex 2 for examples) is to inform the pesticide industry, dealers, users, extension workers, participants in pesticide management and regulatory officials of any regulatory aspect affecting pest control products.

I.8.3 Registration Kit

The registration kit provides documents that must be completed in applying for the registration of a pest control product, together with guidelines on how to complete the documents, labelling advice and generally how to comply with the requirements of the Act and Regulations. The kit includes:

- the Pest Control Products Act and Regulations;
- the official form "Application for New or Amended Registration";
- the "Control Product Specification Form";
- Registration Guidelines; and
- various Trade Memoranda appropriate to the kind of product for which application for registration is to be made.

I.8.4 The Compendium of Pest Control Products Registered in Canada

This compendium comprises some 6000 pages documenting the accepted uses of approximately 500 active ingredients variously formulated in about 5000 registered pest control products. The information is available in separate volumes for insecticides,

herbicides, fungicides, vertebrate pest control products and similar categories. Some volumes are now available through Supply and Services Canada.

Supplements to the compendium are issued at irregular intervals and consist of new and amended uses (including deleted uses) as these changes are made as a result of reevaluation or in response to applications made under the P.C.P. Act. They provide an update to the pest control product use pattern files of interested persons and agencies. They are also available from Supply and Services Canada.

I.8.5 Report of New Registration

This notification is issued upon the registration of a new active ingredient. The RNR (See Annex 3 for examples) provides a brief sketch of the chemical and biological properties of the new product.

I.9 COMMITTEES

A number of committees significantly contribute to the management of pesticides in Canada. These committees provide a valuable network of expert groups among which there is multiple participation by agencies and responsible officials. The resulting deliberations and recommendations on the effective and safe use of pesticides are reflected in the regulatory status of pesticides under the Pest Control Products Act and other relevant federal and provincial legislation.

The regulatory structures and committee systems for pesticides in Canada have evolved over many years as the needs for control and advice were recognized. All disciplines and interests are represented and the means to prevent or correct any untoward effects from pesticide use are in place. The system continues to evolve and improve, however, so that maximum benefit can be derived from pesticide use and so that the risks can be identified and minimized to the greatest extent possible.

I.9.1 Expert Committees

The Expert Committees are responsible to the Canadian Agricultural Services Coordinating Committee (CASCC). CASCC membership consists of the Deputy Ministers of federal and provincial Departments of Agriculture and the Deans of Agriculture of Canadian universities. It is chaired by the Deputy Minister of the federal Department of Agriculture. Four Expert Committees are relevant to this presentation.

I.9.1.1 The Expert Committee on Pesticide Use in Agriculture (ECPUA). The terms of reference of this committee are: a) to advise the Canada Committee on Crop Production Services (CCCPS) with regard to problems or difficulties being encountered with the agricultural use of pesticides (excluding herbicides) for crop and animal protection, and to recommend and stimulate research by all Canadian agencies with an interest in the fields of livestock, forest, vegetables, cereal and forage protection through the use of pesticides in integrated pest management systems. Problem areas include adverse environmental effects, toxicology, registration (especially of minor use pesticides) and pest resistance; b) to make recommendations to CASCC via CCCPS regarding problems identified and advise which agency or group may be best suited to solve the problem; c) to stimulate information transfer between government agencies, universities, industry and provincial Agricultural Services Coordinating Committees (ASCCs). Members of ECPUA are drawn from federal and provincial agencies, universities and industry.

ECPUA also provides a forum for the coordination and exchange of information among four independent committees that serve the western provinces with respect to pesticide use recommendations in that region. These committees are the Western Committee on Crop Pests (WCCP), Western Committee on Livestock Pests (WCLP), Western Committee on Plant Disease Control (WCPDC) and Western Committee on Vertebrate Pests (WCVP).

I.9.1.2 The Expert Committee on Insect Pests of Animals (ECIPA). This committee is similar to the ECPUA in structure and function but concentrates on medical-veterinary arthropod problems and the diseases transmitted by them. The development of a Canada Biting Fly Centre has been one goal. Problems such as those associated with the insecticide treatment of streams, the rapid development of resistance to chemicals, large-scale abatement programs, and similar matters, are dealt with by the committee.

I.9.1.3 The Expert Committee on Vertebrate Pests (ECVP). This newly established committee meets annually, as do all the Expert Committees, to discuss with provincial representatives problems related to agricultural production and wildlife. It is concerned with the use of vertebrate pest control products, mechanical devices, environment manipulation and integrated methods to reduce the adverse effect of vertebrate pests on agricultural production and related health considerations. The goal of the committee is to document research on vertebrate pests, their significance (i.e. cost/benefit relationships), and to fund research where data gaps have been identified.

I.9.1.4 The Expert Committee on Weeds (ECW). This committee comprises a National Executive with membership drawn from federal and provincial governments, universities and industry. The organizational structure of the ECW includes Eastern and Western Canada Sections as well as several subcommittees. The committee is concerned with herbicides and their use and, through a system of review groups, makes recommendations on research requirements and on the acceptability of herbicides for registration from the viewpoint of efficacy and crop tolerance.

I.9.2 The Canadian Association of Pesticide Control Officials (CAPCO). CAPCO is an independent organization with membership composed of representatives from agencies charged by federal or provincial law to regulate pest control products in Canada. Two members may be named by each of the provinces and territories, by Agriculture Canada and by Environment Canada. Health and Welfare Canada may name three representatives. Also, the Executive Council of the association may appoint

representatives from other agencies, associations, committees, etc., as official observers. CAPCO meets twice yearly and addresses all manner of regulatory matters to elaborate procedures of enforcement that are compatible with the various legislative instruments across Canada at federal and provincial levels of government. CAPCO has established working groups which consider particular aspects of pesticide regulation such as classification, investigation procedures, disposal procedures, packaging and similar regulatory subjects.

I.9.3 The Federal Interdepartmental Committee on Pesticides (FICP)

This committee is appointed by Cabinet under the chairmanship of the Assistant Deputy Minister for Research of the Department of Agriculture. The FICP consists of representatives of those federal departments with a direct or indirect interest in pesticides. The committee reports to the Minister of Agriculture and advises Cabinet on matters respecting pesticides as required. The FICP is an advisory committee and its deliberations contribute significantly to federal policies that are reflected in the application of the Pest Control Products Act. Among the various functions of the FICP is the annual review of projects undertaken by federal departments that involve the use of pesticides. This review is carried out to ensure that such projects have been properly evaluated and are consistent with regulatory requirements. Other assignments that have been coordinated under the aegis of the FICP include a national check sample program on pesticide residue analysis, a review of regulatory control procedures pertaining to forest pest control programs, and participation in informal international meetings on pesticides with the United States and the United Kingdom. From time to time, matters of national concern are tabled before the committee to determine a course of action acceptable to the government.

I.9.4 The NRC Associate Committee on Agricultural and Forestry Aviation (ACAFA)

This is one of a number of Associate Committees of the National Research Council that provides a neutral forum to consider the ways and means to improve pesticide application techniques in both agriculture and forestry. Membership is drawn from scientists in both federal and provincial governments with strong representation from the aerial application industry. The thrust of the committee is to make recommendations on required research to the NRC and to develop guidelines respecting good operating practice. Among the accomplishments of ACAFA is a Handbook on Chemical Safety, now published by Health and Welfare Canada, a Flying Training Curriculum for

instructing spray pilots, and a guideline on course work respecting the use of chemicals in crop protection.

I.9.5 Provincial Committees

In addition to the aforementioned committees, all provinces have established groups under a variety of titles that meet regularly to elaborate provincial recommendations on the use of pesticides. These recommendations are revised and published annually for use by farmers and the public. Furthermore, most provinces have interdepartmental committees structured similarly to the FICP described above. These latter committees consider problems of a regional nature and some are the aegis under which significant provincial pest control projects are reviewed.

I.9.6 Industry

The Canadian pesticide industry is largely a formulation industry, with the basic active ingredients imported from the United States, Europe and Japan. The science of chemical synthesis and the development of novel approaches to pest control and their testing originate in the private sector. In addition to individual companies and corporations, industry trade associations play a strong role in managing pesticides. It is in the best interest of the pesticide industry that pesticides be used properly. There are a number of longstanding pesticide industry associations formed, among other reasons, to ensure good operating and marketing practices. The technical committees of these associations have provided and will continue to provide advice to authorities regarding regulatory matters.

The Canadian Agricultural Chemicals Association (CACA) represents 80% of the companies that develop and market commercial pesticides in Canada. The Canadian Manufacturers of Chemical Specialties Association (CMCS) represents companies that develop and market pesticides largely for home owner use. Both associations have standing technical committees whose purposes are to liaise with regulatory agencies and to participate in many of the committees referred to earlier.

I.9.7 International Organizations

In addition to the national legal, organization, and committee structures, a number of important international bodies have a significant impact on pesticide use and control.

Under the aegis of the United Nations, the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) play a strong role in the management of

pesticides. Developing countries, in particular, are very dependent upon pesticides for food production and for the protection of public health. While developed nations such as Canada and the United States are no less dependent upon pesticides, developing countries rely heavily upon FAO and WHO for advice and support in pest and disease control. Regulatory actions taken in Canada and the U.S. have considerable impact on the welfare of developing nations. Because pesticides are necessarily worldwide commodities, it follows that international considerations are vitally important to their overall management. Canada participates in the operations of FAO and WHO for the purpose of providing expert advice, as well as deriving benefits from the international coordination of policies and regulatory actions.

A good example of international cooperation in pesticide related matters is the Codex Alimentarius Commission and the operation of the Codex Committee on Pesticide Residues (CCPR), one of a number of Codex committees that address international food standards. Most developed countries contribute to the operation of the CCPR because they have food laws under which legal pesticide residue limits are established, as they are in Canada under the Food and Drugs Act.

Food commodities moving in international trade must comply with the legal pesticide residue standards of the importing country. Growing conditions and pest problems vary greatly from country to country and, consequently, so does the need for pesticide use. To rationalize the need for pesticide use from country to country and the pesticide residue potential that may result, it is essential that national and legal pesticide limits recognize this need in accordance with good agricultural practice. The CCPR membership includes some 50 nations that meet annually in the Netherlands to reach agreement on internationally acceptable pesticide residue limits.

Pesticide residue limits on food commodities under consideration by the CCPR are those recommended by a Joint Committee of Experts drawn from the Food and Agriculture Organization and the World Health Organization. Since Canada and other countries provide expert participation to FAO, WHO and the Joint Committee, a consistency of evaluation criteria emerges in the assessment of potential health effects among countries that participate in international trade of food commodities. Thus, Canadian pesticide residue limits, established under the Food and Drug Regulations, are consistent with domestic uses and also recognize international needs as far as possible when relevant data are available for evaluation.

The International Program on Chemical Safety (IPCS) is a cooperative program of the World Health Organization (WHO), the United Nations Environment Program

(UNEP) and the International Labour Organization (ILO). The objectives of this program are to assess the effects of chemicals on human health and on the quality of the environment, to develop guidelines on exposure limits, to develop guidelines on appropriate methods for toxicity testing, epidemiological and clinical studies, and risk and hazard identification quantification and evaluation, to co-ordinate laboratory testing and epidemiological studies where an international approach is appropriate, and to develop information for coping with chemical accidents. To achieve these objectives with respect to pesticides, existing committees operating within WHO will now be part of the IPCS.

There is international cooperation concerning the environmental consequences of pesticide use by virtue of the deliberations of the Organization for Economic Co-operation and Development (OECD). The OECD, however, is less well developed than the CCPR in the area of pest control products.

The International Register for Potentially Toxic Chemicals (IRPTC) is a subsidiary organization of the United Nations Environment Program which acts as a data bank for toxic chemicals, including pesticides, and contributes to the running of an international alert system following chemical accidents.

In the pesticide regulatory field, a number of international bodies influence the management of pesticides in Canada. In the United States the Association of American Pesticide Control Officials (AAPCO) serves a function similar to that described earlier for CAPCO. Canada has been a member of AAPCO since its inception 30 years ago. AAPCO meets twice yearly and has provided a forum for the elaboration of common philosophies, regulatory procedures and policies between Canada and the United States with respect to the regulation of pesticides.

The Council of Europe, consisting of representatives from European countries and the United Kingdom, has aims and objectives similar to those of AAPCO and CAPCO. While there is a free exchange of information among these associations, the FAO is seriously considering a broader international body to draw regulatory officials together for the elaboration of common guidelines that can be implemented to the degree possible in all countries.

Industry has established the International Group of National Associations of Agrochemical Manufacturers (Groupement international des associations nationales de fabricants de produits agrochimiques (GIFAP)) to represent its interests internationally. The Canadian association, CACA, and its United States counterpart, the National Agricultural Chemicals Association (NACA), are members of GIFAP and through this association provide valuable input to international agencies concerned with pesticides.

While there appears to be a bewildering array of committees concerned with various aspects of pesticide use, and what appears to be overlapping regulatory structures among agencies and governments, the system has evolved slowly over many years and serves the public interest well. The culmination of policy directives, evaluation criteria, regulatory structures and enforcement procedures is reflected in the operation of the Pest Control Products Act and Regulations. The common objective is to ensure that pest control products are not used in an unsafe manner, consistent with the need for their use in the welfare of mankind in all his varied interests and activities.

PART II - ENVIRONMENTAL AND HUMAN HEALTH ASPECTS

II.1 INTRODUCTION

The Pest Control Products Act, the principal federal law that governs the sale and use of pesticides in Canada, its Regulations, the regulatory procedures and directives issued under its authority, and the committees that significantly contribute to the management of pesticides are elaborated in Part I of this paper. The main focus of Part II is on the environmental and human health aspects of pesticide use and control.

The initial and continued acceptability of a pest control product for registration, as well as the conditions for its sale and use, are determined by the pesticide review process. Details of this process, the kinds of scientific information required for evaluation and the areas of concern of the principle agencies involved are given in this part.

Various research and monitoring programs are carried out by the federal government to determine and assess environmental and human health effects resulting from the use of pesticides. The results obtained make a significant contribution to the evaluation process and hence to the management of pest control products. These programs as well as surveillance activities are discussed.

Finally, information is provided on other subjects, such as education programs and information exchange, that are relevant to the use and regulation of pesticides in Canada.

II.2 PESTICIDE REVIEW PROCESS

Under the authority of the Pest Control Products Act, Agriculture Canada registers pest control products through a comprehensive interdepartmental registration review process involving considerable resources and expertise. The kind of scientific information that is required for evaluation purposes in this review process is specified in Section 9 of the Pest Control Products Regulations. This information includes results of investigations demonstrating the effectiveness of the product and its safety to man and the environment. The development of data on efficacy, residues and environmental impact is required in all areas of Canada because regional differences in soil, climate, crop varieties and cropping practices are taken into consideration in the evaluation process. The goal is to achieve national use patterns, although some compounds are limited to regions where the need is demonstrated and the data are relevant. To develop this information according to present disciplinary needs, industry has estimated that an expenditure of 14-20 million dollars and 6-10 years is required before an application for registration can be contemplated.

II.2.1 Agriculture Canada

The Pesticides Division of Agriculture Canada receives applications for registration of pest control products and is responsible for the evaluation process and the coordination of reviews from other departments and agencies. The staff of this division includes professional biologists and chemists as well as non-technical and clerical support members. The Laboratory Services Division provides the services of analytical chemists for the evaluation process in addition to the analytical programs carried out for the purposes of the Act.

The Research Branch of the department also provides a significant advisory service in the evaluation of pesticides. It maintains a staff of research scientists and other professionals at Research Stations throughout Canada who are engaged in pesticide research. Through their research programs, this staff contributes to the evaluation process by developing data on efficacy, crop safety and residues of new candidate pesticides and new uses of registered products. This research enables the Branch to advise the administrators of the Pest Control Products Act on biological efficacy, crop tolerance and freedom from undesirable levels of residues in the crop and soil.

II.2.2 Environment Canada

The Department of the Environment has an important role as an advisor to Agriculture Canada in the pre- and post-registration evaluation of the environmental effects of pest control products. The areas of concern of this department in the pesticide review process are: wildlife (especially birds), other non-target biota, the efficacy of the pesticide in reducing forest damage caused by insects and diseases or in managing undesirable vegetation in forest areas, the potential of the pesticide for contamination of the environment, and the adequacy of disposal instructions provided on the labels.

Evaluation of the environmental hazard of new pesticide products essentially consists of two fundamental aspects, a) estimation of exposure levels to non-target organisms, and b) toxic response of biota to these exposure levels. A model describing the environmental chemistry and behaviour of pesticides would provide the ideal method for estimating environmental exposure levels. Unfortunately these models and the test protocols, which are key components of the overall model, are not yet fully developed. Estimation of exposure levels is, therefore, a matter of judgement based on past experience with similar pesticides, geographic area and pattern of use, and on data relating to physico-chemical properties (e.g., volatility, solubility), mobility (leaching and runoff) and persistence, including the toxicity and fate of degradation products. Estimation of toxic response to exposure levels involves evaluation of data on lethal and sublethal effects in acute and chronic bioassays, metabolism including toxicity and fate of the metabolites as well as the bioconcentration potential. It is not always necessary to have all of these kinds of data to evaluate a pest control product. For example, compounds with high water solubility and short half-life are usually not subjected to bioconcentration and chronic tests. On the other hand, if the information available to assess the environmental effects of a pesticide is insufficient or unsatisfactory, the applicant must supply new data to satisfy the requirements of the reviewing agency.

II.2.3 Fisheries and Oceans Canada

The Department of Fisheries and Oceans is responsible for the conservation and protection of fish and their habitat under the Fisheries Act. Because of this responsibility, the department plays a vital role in advising the Department of Agriculture regarding the registration and regulation of pesticides. Since this advisory role was formalized with Agriculture Canada in 1974, advice has been provided on pesticide registrations, reevaluations of currently registered pesticides, research permit requests, and a variety of other aspects of pesticide use in Canada. The advice provided directly

supports the responsibilities of Agriculture Canada to ensure safety of registered pesticide products and also satisfies the objectives of Fisheries and Oceans Canada to protect fish and the habitat upon which they depend.

The reviews of registration applications are conducted by the Chemical Hazards Division of the Fish Habitat Management Branch in Ottawa. Regional scientists of the department also provide specialized input into these reviews as necessary. To assess the risk of the use patterns of a particular pesticide, the department requires a variety of data including physico-chemical properties of the active ingredients and formulations; modes and rates of degradation; persistence and fate in soil, water and sediments; bioconcentration; and acute and sublethal responses of the chemical to fish and aquatic invertebrates. The data provided by the pesticide companies along with the information available on a variety of data bases are evaluated to estimate aquatic environmental exposure levels of pesticides and their probable toxic impact on aquatic ecosystems. While assessing the risk of a pesticide to aquatic ecosystems, particular attention is given to the geographical area of use, the watersheds involved, and the method and timing of pesticide applications.

When the department considers the data provided with an application for registration inadequate, further data are requested from the applicant. Since the department recognizes the scarcity of standard test protocols, it encourages the industry to discuss special laboratory and field testing protocols with staff of the Chemical Hazards Division. Occasionally the regional laboratories of the department find it necessary to conduct tests on their own to augment the existing data base on a particular pesticide product.

II.2.4 Health and Welfare Canada

The mandate of the Health Protection Branch of Health and Welfare Canada with respect to the safety of pesticides involves the assessment of potential health hazards from occupational and bystander exposure and from residues in food resulting from proposed new uses and existing uses of pesticides.

In the area of occupational or bystander health hazards, the Environmental Health Directorate evaluates the data submitted on all pesticides that are to be used in Canada and advises Agriculture Canada of the potential effects on human health.

The responsibility of the Food Directorate is to ensure that the use of pesticides on or near foods will not result in residues which may violate the Food and Drug Regulations, and that foods produced in Canada are safe, clean and unadulterated.

To evaluate new pesticides and new uses of existing pesticides, and to reevaluate presently used pesticides, extensive data are needed by the Health Protection Branch. Manufacturers of pesticides are requested to submit detailed data on the following:

(a) specifications and composition of the substance to be used as a pesticide;
(b) the physical and chemical properties of the substance;
(c) plant and animal metabolism studies;
(d) evidence that the product is effective and practical;
(e) the amount to be applied, frequency and time of application;
(f) satisfactory methods of analysis for determining residues in foods;
(g) toxicity studies;
(h) a proposed maximum residue limit for each food; and
(i) a proposed maximum exposure limit to workers and bystanders.

The toxicity tests must be conducted on a number of different species and include acute, short term and long term exposure to the pesticide using the oral, dermal and inhalation routes of exposure. The selection of tests allows assessment of the toxic effects on all systems of the body, as well as the potential to cause birth defects, mutations and cancer.

From both the manufacturers' toxicity studies and other data which may be available, scientists in the branch determine for each pesticide, the dose per unit of body weight producing no observable adverse effects in each of the animal studies. This is referred to as the N.O.E.L. (no effect level). The lowest N.O.E.L. from these studies is then divided by a safety factor, usually 100, but it can range between 10 and 5000 depending on the toxicity of the pesticide. The figure obtained is regarded by the Food Directorate as an acceptable daily intake (ADI) for humans for that particular pesticide. The ADI is the amount of pesticide that toxicologists consider safe for humans to consume each day for an entire lifetime. A similar approach is utilized to establish an acceptable exposure for workers and bystanders.

Maximum residue limits for pesticides on food are established by determining the amounts likely to remain in food at point of first sale, after pesticides are used in accordance with registered uses or good agricultural practice. Such residue limits are only accepted providing that the total consumption of residues from all food uses will not exceed the ADI for the particular pesticide.

The Health Protection Branch considers the applicant responsible for proving the safety of any pesticide he wishes to register for sale and use in Canada. The applicant is also responsible for discussing detailed data requirements for specific chemicals with Health Protection Branch officials.

II.3 IMPORTATION OF PEST CONTROL PRODUCTS FOR SOLE USE BY IMPORTER

In the past an exemption provided in the Pest Control Products Act permitted the importation of pest control products into Canada for the importers' own use without requiring that they be registered under the Pest Control Products Act. However, a notification procedure regulated this importation (Sections 55 and 56 of the Pest Control Products Regulations). Farmers importing pest control products for their own use were required to notify the District Supervisor, Agriculture Canada, to ensure that the imported material was registerable in Canada. Nevertheless, because these products were not in fact subject to the review process required for registration under the Pest Control Products Act, nor to inspection carried out by Agriculture Canada to ensure compliance with product specifications, they represented a greater potential hazard to the environment, the user, and the crop, than registered products. As a result of these and other concerns the Minister of Agriculture undertook a review of this practice and decided to dissallow all further importation of these products as of March 3, 1977.

II.4 CONTINGENCY PLANS IN CASE OF ACCIDENTS

Provincial emergency measures or disaster organizations are responsible for ensuring that adequate contingency plans are developed by, or for, plants manufacturing, formulating or packaging pesticides. Depending on the nature of an accident involving pesticides either Environment Canada or Emergency Planning Canada coordinate any federal response. The regional offices of Health and Welfare Canada are also available to support local authorities in the event of accidents, by mobilizing first aid equipment, doctors, emergency hospital facilities, etc.

While federal departments such as Environment Canada and Agriculture Canada can provide information regarding the handling of pesticide spills resulting from transport accidents or an airplane crash, the manufacturer of the chemical involved in the accident is generally the best source of information for handling the situation.

Emergency response plans for accidents involving the transport of dangerous goods will be included in the Regulations made pursuant to the Transport of Dangerous Goods Act. The intent of this Act is outlined in Part I. Environment Canada is involved in the evaluation of materials for their environmental hazard, while Health and Welfare Canada provides expert toxicological advice on the potential human health hazards of materials designated for shipment by commercial carriers. The latter department also participates in the assignment of appropriate packaging standards to minimize the risk of a spill resulting from a transport accident.

II.5 INFORMATION EXCHANGE AND EDUCATION PROGRAMS

The federal government has initiated a number of programs related to the collection and dissemination of information concerning pesticides. A number of education and training programs are also available, many of which are provided by the provinces. Concerns that have been expressed regarding various aspects related to these programs are addressed below.

II.5.1 Federal-Provincial Information Exchange

Most provinces have established interdepartmental committees similar to the Federal Interdepartmental Committee on Pesticides. These committees provide a formal mechanism at the regional level for the participation of all regulatory and disciplinary interests in matters concerning pesticides. Furthermore, these committees provide a means of approaching officers of the various responsible and interested agencies on an informal basis.

Under the aegis of the Canadian Association of Pesticide Control Officials (CAPCO) a guideline for appropriate procedures and communications related to the investigation of pesticide residues has been produced. The federal and provincial agencies that should be involved in this investigation with regard to the nature of the residue and its impact, e.g., food, feed, livestock or environment are suggested in the guideline.

II.5.2 Release of Information to the Media

Regulatory and participating officials at all levels of government are consulted by means of Registrant or Trade Memoranda before information on pesticides is released to the media. Furthermore, members of CAPCO are kept fully informed and frequently participate in the development of regulatory changes. Consequently, when changes to the regulatory status of pest control products are announced, these officials or their governments have received prior information.

II.5.3 Notification of Pest Control Programs and Compliance with Provincial Regulations

It is general policy that any pest control program carried out by the federal government will seek to comply with provincial regulatory requirements. Pest control operations under the authority of the Plant Quarantine Act, however, are conducted in the national interest and may be construed to pre-empt regional authority. This interpretation notwithstanding, all pest control operations contemplated by federal agencies are

submitted, in accordance with a policy directive, to the Federal Interdepartmental Committee on Pesticides (FICP) for approval. Such approval is contingent upon an evaluation of the overall risk involved and compliance with both the P.C.P. Act as well as applicable provincial regulations.

II.5.4 Pesticide Use Data

To date, quantitative data on the use of pesticides have not been compiled on a comprehensive basis. Several provinces, however, require, by legislation, permits for the use of some restricted pest control products. These permits provide a source of precise information on the use of these products. An opportunity to compile precise information on the use of a product is also presented in those instances where the special restrictions under the P.C.P. Act make this information readily available.

Specific records of areas treated with soil sterilants have not been kept. These pest control products, as a class, are not normally used on lands that are likely to be used for crop production. Nevertheless, a number of crop herbicides have residual potential that may limit the development of other crops in the succeeding year. Atrazine, important in corn production, carries over in the succeeding year in sufficient quantity to be detrimental to certain alternative crops, e.g. soybeans. Evaluation for registration purposes, however, takes persistence into account and undue persistence is grounds for refusal to register. Where a tolerable persistence occurs (not more than one year), warning statements appear on the label of the pest control product. The onus is then on the user to follow the label instructions.

II.5.5 Information on Safe Use of Pesticides

There is a possibility that, in some cases, the users of pest control products in the Commercial class, as described in Part I, require a better understanding of the safe use of pesticides. Where adverse effects have occurred, however, lack of attention to label directions or outright misuse has usually been the cause. These incidents are often widely publicized. Nevertheless, statistics show that poisonings and accidents involving pesticides are relatively rare.

Additional steps can be taken through training and regulatory action to promote the safe use of pest control products. Considerable information on pesticides is already published and available to users and the public. An example of the publications available is the booklet entitled "Aerial Application of Pesticides Safety Manual" (previous editions were published under the title "Handbook on Chemical Safety in the

Aerial Application of Chemical Materials"), published by Health and Welfare Canada. This booklet is referred to in Part I as one of the accomplishments of the NRC Associate Committee on Agricultural and Forestry Aviation. General booklets on widely used pesticides put out by the provinces provide very useful information on the safe use of pesticides, including that relating to human health and safety.

II.5.6 Coordination of Federal and Provincial Inspection Programs

Unlike most commodity groups, pesticides are regulated under both federal and provincial legislation. It follows that considerable coordination is needed in the inspection programs of both levels of government. Coordination in the inspection programs is provided through the Canadian Association of Pesticide Control Officials. This association has established a "Regulatory Procedures Committee" that is responsible for the elaboration of compatible inspection procedures that satisfy the relevant legislation in the field.

II.5.7 Education and Training Programs

There is a need for education and training programs on the use of pesticides. Certain provinces have already initiated such programs for pesticide dealers and professional users of these products. These include some excellent training programs for pest control operators. These programs are important because attention to safety measures and to the proper handling of pesticides by pest control operators greatly minimizes the potential hazard associated with pesticide use. As indicated in Part I, the National Research Council Associate Committee on Agricultural and Forestry Aviation (ACAFA) has also contributed to this aspect of pesticide management.

Many other countries, notably the United States, have published core manuals and curricula for the education and training of pesticide users. In Canada, the coordinating body to achieve consistency and national uniformity of instruction is the Canadian Association of Pesticide Control Officials.

II.5.8 Metric Conversion

Pesticide labelling regulations with respect to metric measure have been produced under the authority of the Pest Control Products Act and were fully implemented in January 1981. Conversion standards and procedures were developed in cooperation with industry and interested government agencies. Pesticide manufacturers must now use metric only labels when packaging their products. The conversion includes all rates of

application, volumes, areas, etc., as well as net contents. Residual stocks of previously packaged and distributed pesticides bearing "imperial" labels will be deleted through sales.

Agriculture Canada has developed and published information bulletins for distribution to various categories of users. These bulletins deal with particular user categories, such as greenhouse operator, orchardist, field crop and vegetable grower, and homeowner, and provide specific instructions on the use of metric measure in those areas. This information program provides the basis for further initiatives by industry and the provinces to inform pesticide users on the details of this changeover.

II.6 DISPOSAL OF PESTICIDES AND CONTAINERS

The disposal of unwanted pesticides, pesticide containers and materials contaminated with pesticide, such as waste resulting from the cleanup of spills, has emerged as a problem to both governments and the public. One of the difficulties is that such items are generally "owned" by the public at large when disposal is required. The elaboration of techniques and procedures for disposal requires the collaboration of the pesticide industry, regulatory officials and the user public. Various aspects related to this subject are currently being addressed by the Departments of Agriculture and Environment.

To facilitate the disposal of pesticides from federal facilities, Environment Canada has developed a management scheme which includes procedures for handling, collection, storage and disposal. The department will provide advice, upon request, to both provincial authorities and the public on matters related to the disposal of pesticides.

Instructions for the disposal of empty containers and small quantities (no more than 5 litres or 1 kilogram) of unused, unwanted pesticide, as well as supporting information, are provided by the applicant for registration for consideration in the pesticide review process. These instructions are given on the label and they are also reviewed and revised, if necessary, during post-registration reevaluations of pest control products. Where specific directions for disposal of the product are not given, instructions on the label advise the user to contact the appropriate authority for disposal procedures.

II.7 MONITORING AND SURVEILLANCE

The degree of federal government involvement in monitoring (to evaluate pesticide effects on non-target organisms or to measure levels of pesticide residues in terrestrial or aquatic environments) and surveillance (to ensure compliance with respect to the pesticide regulations and prescribed procedures) has varied depending upon the nature of the program.

Environmental monitoring programs face acute scientific and budgetary problems. The most immediate is the difficulty of sampling, particularly with respect to large scale pest control programs. There is such variability in the pesticide regimes in programs such as those for forest pest control, in the local deposition of pesticides, and in species population dynamics, that it is frequently impracticable to collect enough samples to give a statistically significant overview of environmental effects for the whole landscape. Large programs such as these are complex and extensive and tax the capacity of monitoring resources to meet the task adequately. Since an overview of a spray program's effects on the non-target fauna is desirable, the investigators must exercise considerable judgement in interpreting and projecting from an inevitably thin information base. Monitoring methodologies may vary and as a result divergent inferences may be drawn by different investigators. Differences in interpretation are therefore not necessarily a measure of opposing viewpoints but rather they may be an indication of the complexity of the problem. In monitoring, the interaction of the organisms studied has to be considered with respect to their total ecosystem and evaluated in terms of natural fluctuations. This is an area in which we have to try and make sound judgements on an incomplete data base. Despite the problems facing monitoring activities it is worth noting that, to date, in the field of forest pest control no significant, long-term detrimental environmental side effects have been shown to be positively associated with, for example, large scale budworm spraying programs such as those conducted in New Brunswick and Quebec during recent years.

The Department of the Environment carries out independent monitoring programs and it has also participated in pest control programs, such as herbicide applications along rights-of-way and forest spray projects, in many of the provinces for a number of years. This has generally been done in cooperation with the provinces. Monitoring activities have ranged from carrying out significant parts of monitoring programs to developing methodologies and providing instructions to the provinces in the use of appropriate monitoring methods. As the provinces have developed monitoring

capabilities, some of the services in the department, for example, the Canadian Forestry Service and the Canadian Wildlife Service, have moved away from active monitoring of some programs such as those for forest pest control. Their activities related to these programs are now directed more towards the development of improved methodology which is transferred to the provinces concerned. The Environmental Protection Service, and the Inland Waters Directorate, Environmental Conservation Service, however, continue independent and cooperative monitoring activities. The department has also been involved in surveillance activities related to pest control programs.

The Department of Fisheries and Oceans is committed to ensuring the safety of fish and their habitat. The department has been involved in monitoring a variety of pesticide programs across the country, such as forest spraying programs and larviciding programs for the control of blackflies, and in monitoring organochlorine residues in marine and freshwater fish. Whenever appropriate, these programs are carried out in cooperation with the provinces. The department also investigates occasional fish kills but this capability is limited by the lack, or the inadequacy, of analytical methods for newer pesticides. The Inspection Branch of the department also monitors residues of some pesticides in commercial catches to ensure compliance with national and international tolerances.

The Field Operations Directorate of the Health Protection Branch, Health and Welfare Canada, is responsible for monitoring and investigating possible violations of the Food and Drugs Act and Regulations. This involves monitoring, inspection, education and analysis for pesticide residues on over 2000 samples of imported and domestic foods each year. When information indicates a violation of the Food and Drug Regulations, appropriate action is initiated and may involve removal of foods from food outlets, seizure of food stocks, rejection of imports or prosecution. Food inspectors of Health and Welfare Canada maintain close liaison with local agriculture officials and other agencies.

Since the direct effects of pesticides on human health fall under provincial jurisdiction, the involvement of Health and Welfare Canada in surveillance and monitoring activities is at the request of the provinces. The department has been involved to a limited extent in studies monitoring agricultural workers exposed to pesticides such as parathion. It has participated in the forest spray programs in New Brunswick and Quebec by checking the safety of equipment, ensuring that first aid is available and generally advising supervisors and workers of the hazards of pesticides.

Monitoring also forms an integral part of many research projects on pesticides, particularly those designed to determine such aspects as environmental effects, persistence, residue levels and effects on human health.

II.8 RESEARCH PROGRAMS

Research on pesticides is carried out by a number of federal departments. The following is a brief outline of their programs in this field.

II.8.1 Agriculture Canada

As indicated earlier in this paper, this department conducts research to evaluate the efficacy of pesticides, crop safety and residue levels resulting from the use pattern. These data are utilized to support registration, in the development of registration protocols and for providing advice to farmers and the public on pest control. Other programs are directed at the development and implementation of methodologies for pesticide residue monitoring and the development of systems to minimize the impact of pesticides on the environment and on human and animal health.

The department is also conducting research designed to reduce the amount of chemical pesticide used. Some of these programs are directed towards improving application methods, thereby improving the efficiency and reliability of treatments. These include projects that examine the effect of spray droplet size on efficacy and non-target drift, the design of field sprayers that deliver droplets of uniform size, the reduction of spray drift, the enhancement of the penetration of pesticides into target tissue and the evaluation of methods for improved soil incorporation of pesticides. Other programs establish economic threshold levels whereby crop damage is equated against the benefits derived from specific pesticide application regimes, and cost/benefit ratios for a given pest/crop complex are determined. The information obtained in these latter programs will enable a reduction in the use of a pesticide because treatments will be adjusted to the degree of infestation. The development of disease resistant varieties and propagation of pathogen-free plants have also reduced dependence on pesticides.

Research programs on integrated pest management are being expanded to accelerate the reduction of dependence on chemical pesticides. An integral component of these programs involves the identification, selection and management of microbes and insects that are natural enemies of plant pests, and the development of these agents as biological pesticides. Work is being done on the use of sex pheromones, juvenile hormones and sterile male techniques. Other factors coming to prominence with regard to insect control and, hence, reduced use of insecticides, involve an awareness of the genetic resistance of plants to insect and microbial attacks, natural biological competition and

host preference as well as environmental conditions conducive to insect and microbial development.

II.8.2 Environment Canada

Research on pesticides carried out by this department is related to their environmental effects, to the protection of forests from unacceptable damage by insects and diseases, and to the use of herbicides as effective silvicultural tools.

The forest-related research includes laboratory and field trials on chemicals and biological pesticides to determine their potential for forestry use and to assess their efficacy in the control of forest pests, to determine their impacts on non-target components of the forest ecosystem, to develop improved application technology and use strategies that will optimize effectiveness and minimize undesirable side effects, and to determine the persistence and ultimate fate of pesticides and their breakdown products. Cooperative reseach with the pesticide industry is also conducted where appropriate to evaluate new and improved pesticides and/or pesticide formulations for forestry use. For example, new flowable formulations of aminocarb and fenitrothion are now under intensive study and it is hoped that they will prove to be as efficacious against major pests like the spruce budworm as their precursors, but more environmentally innocuous. Similar research and testing is being initiated for forestry use herbicides to provide new and improved silvicultural tools for forest managers. The information obtained through such research is used to provide data upon which registration evaluations are based and to advise regional forest research centres, provincial departments, industry and Agriculture Canada on pesticide use patterns for operational programs and on monitoring activities to assess environmental impact.

The more subtle, longer term effects of pesticide use are being studied by the department in experimental forests. A long-term study on fenitrothion in an experimental forest which was maintained in the National Capital Region has been completed. Over seven years, repeated treatments of fenitrothion at operational dosages have been followed by studies on the vertebrate and invertebrate fauna to determine lethal and sub-lethal effects, including the possible disruption of food webs. The results obtained have shown that, under the conditions of this long-term experiment and carefully controlled operational dosages of fenitrothion, the prolonged use of this particular pesticide has had a minimal effect on the integrity of this forest. In 1979, a new long-term environmental study area was established in a mixed-wood forest north of Sault Ste. Marie, Ontario. Baseline data on the flora and fauna in the terrestrial and aquatic components of this

particular ecosystem are now being collected prior to the treatment of the area first with simulated aerial sprays (minus active ingredient) to determine penetration of spray clouds to specific environmental niches and secondly with actual pesticide applications to provide quantitatively accurate short- and long-term impacts throughout the ecosystem. Long-term studies such as these against a thoroughly documented forest ecosystem background are essential to a complete understanding of the impact of pesticide use and the persistence and ultimate fate of pesticides and their breakdown products in the forest ecosystem. This research should also result in improved methodologies for impact monitoring.

Research on the development of alternatives to chemical pesticides for the management of forest pests is in progress. With respect to forest insect pests, alternatives being studied include insect pathogens (bacteria, fungi, viruses and protosoa), insect growth regulators, sex pheromones, genetic manipulation and combinations of these agents with each other or with reduced amounts of chemical insecticides. To date, the only biological control agent that is commercially available for forestry use in Canada is the bacterium, Bacillus thuringiensis. Recent large scale cooperative testing of this biological insecticide in Canada and the United States has confirmed its usefulness against important forest pests such as the spruce budworm. Continuing improvements in formulations and application technology and the development of more virulent strains of this pathogen will undoubtedly increase its use. Also, these improvements should lower the costs of the control programs that use this biological insecticide. In 1981, the department submitted a registration petition for a very effective virus against the red-headed pine sawfly which is a serious pest of red pine plantations in eastern Canada. This is the first registration petition for a forestry use virus that has been submitted in Canada and it will be followed shortly by a petition for a similar type of virus against the douglas fir tussock moth. While chemical insecticides will remain our first line of defense against many forest insects for some time to come, these new developments auger well for reduced reliance on chemical insecticides in the future.

A nation-wide breeding bird survey, in its 17th year in 1982, gives an index of bird populations. This survey has been used in conjunction with monitoring activities to determine the long-term effects of forest spraying. Studies based on banding data are also used to determine if annual mortality is altered in areas of pesticide use. So far, these studies do not show any clear-cut long-term effects from forest spray programs in spite of severe mortality of songbirds that has occurred on occasion. Field studies on the effects of forest spraying on singing behaviour, brain cholinesterase activity, and

reproductive success of white throated sparrows are nearing completion in New Brunswick.

Studies on changes in prairie pothole productivity associated with the uses of herbicides have been made. Both the number of species of invertebrates and the total mass of invertebrates is reduced and changes occur in the amount and kinds of vegetation. Alterations of plant community structure have been found to be caused by the use of herbicides and the possible effects of these changes on wildlife habitat are being assessed. Aerial drift of herbicides and secondary poisoning hazards of rodenticides are under investigation.

The department also carries out some applied research related to the environmental effects of pesticides. In general, monitoring methodology is used in tests to determine the levels of pesticides in the environment or effects of spray programs on such aspects as components of various ecosystems and the effectiveness of buffer zones to protect the integrity of specific ecosystems. These tests provide background information useful in establishing guidelines for proposed pest control programs and in carrying out inspection of spray operations.

II.8.3 Fisheries and Oceans Canada

The department carries out research on environmental chemistry and effects of pesticides on aquatic systems.

Research programs related to the effects of pesticides on aquatic ecosystems include studies on the biology of fish and other aquatic organisms and their habitat relationships. These kinds of studies provide information on the effects that might be expected from changes in habitat caused by pesticides, such as the application of herbicides to aquatic environments. In addition, studies are carried out on alterations of populations of aquatic invertebrates (such as stream insects), the effects of these alterations on fish populations, and the influence of pesticides on fish behaviour and survival. The research program includes studies to establish acute and sub-acute tolerance limits to pesticide concentrations for the important fish species inhabiting streams and lakes, either as permanent residents or for part of their life cycle.

Research programs being conducted at the various regional laboratories across Canada relate to both acute and chronic toxicity of pesticides to fish and other aquatic organisms, environmental dynamics of pesticides, analytical techniques to detect and quantify pesticide residues in fish and aquatic organisms, structure activity relationships, and the development of predictive models.

The department's Inspection Branch routinely monitors commercial catches of fish for residues of pesticides of significance such as the organochlorine insecticides. The regional establishments of the department occasionally conduct chemical and biological monitoring in relation to pesticide uses of direct significance to the fisheries resource.

II.8.4 Health and Welfare Canada

Research on pesticides conducted by the Health Protection Branch falls into two broad categories: assessment of the toxicity of pesticides and development of methods for their detection. The toxicity of selected pesticides, such as organophosphorus insecticides and ethylene thiourea is presently being studied. A number of organophosphorus pesticides are being assessed for their toxic and neurotoxic properties. In addition, the teratogenic, mutagenic, and carcinogenic potential of specific pesticides are being assessed.

Research is also being conducted on the development of automated screening procedures for detecting pesticide residues in food. These procedures will be used in future monitoring programs. A similar project is being carried out to develop screening methods for pesticides in drinking water.

The department started a research project in the spring of 1977 in which various approaches to monitoring pesticide exposure in agricultural workers is being investigated. One of the approaches studied is nerve conduction velocity and its correlation with the more generally measured blood cholinesterase levels.

II.9 CONCLUSION

Despite the potential dangers to the environment and human health often associated with the use of pesticides they have become essential to mankind's general welfare during the past few decades. Pesticides have made significant contributions to agriculture, forestry, industry, and indirectly to public health.

An example of the benefits derived from the use of pest control products is the current level of agricultural production, where their use has made a marked contribution to supplies for both domestic and export markets. In 1980, Canada exported 7.8 billion dollars in agricultural produce while it imported 5.1 billion dollars worth, leaving a net trade balance of 2.7 billion dollars as earnings for the economy. Although less than 5% of our population is involved in agricultural production the output per worker has quadrupled since 1949, whereas productivity in the commercial sector only doubled between 1949 and 1980. A significant part of this achievement in agricultural production efficiency is due to effective pest control which accounts for approximately 30% of current production. The cost of pest control in 1980, based on chemical sales to agriculture of about 370 million dollars, represented only 3.7% of farmers' total operating expenses. Similar benefits accrue in other sectors of the economy where pesticides are used. In forestry, for example, it has been estimated that, between 1977 and 1981, where no protection operations were carried out, the spruce budworm caused an average annual depletion of approximately 44 million cubic metres of balsam fir and spruce, an amount equivalent to almost two-thirds of the annual harvest of softwoods in eastern Canada. On the other hand, where forest protection operations utilizing chemical insecticides against the budworm have been sustained, the green and living forests are testimony to the effectiveness of pesticide treatments. Canada has recently embarked on a major program of forest renewal and intensive forest management to retain and/or improve her share of the world trade in forest products. By definition this will require the increased use of insecticides to reduce the very substantial losses resulting from major forest insect pests, as well as the increased use of forest herbicides for site preparation and conifer release.

On the other hand, the indiscriminate use of pest control products can result in unwarranted environmental damage. The use of pest control chemicals must therefore always be based on a careful risk/benefit analysis. Since the study of long-term factors necessarily takes a long time, such risk/benefit analyses presently tend to be based on short-term considerations as they apply to human health, the environment and productivity. When research results become available, additional factors will be taken

into account, such as: the continued productivity following repeated applications of pesticides (and fertilizers) over many years (short-term gains may be counterbalanced by long-term losses); the impact of pesticide use on the genetic diversity of various biological species; the development of pesticide-resistant strains of pests; the long-term environmental effects; and the long-term chronic low-exposure consequences of pesticides to humans.

ANNEX 1
MEMORANDA TO REGISTRANTS

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH / DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE March 1, 1982	R-1-200
	PESTICIDES DIVISION	

MEMORANDUM TO REGISTRANTS

RE: Revision of Memoranda to Registrants

The purpose of this memorandum is to provide registrants with an updated list of Memoranda to Registrants issued by the Pesticides Section of the Plant Products and Quarantine Division.*

The following table shows the changes which should be made in your loose-leaf book of memoranda to bring it up to date:

Delete	Insert	Title	Comments
R-1-200 (1/12/80)	R-1-200 (1/03/82)	List of Memoranda to Registrants	Updated
R-1-81 (17/07/80)	-	Renewal of Registration of Pesticides	No longer relevent
-	R-1-211 (30/10/81)	Guidelines for Pesticide Toxicology Data Requirements	New memorandum
-	R-1-212 (4/11/81)	Re-evaluation of MCPA	New memorandum

Please note that you may not have received all of the memoranda listed here; unlike Trade Memoranda, Memoranda to Registrants are not necessarily distributed to all registrants. For an outline of the functions of these two series, please see Trade Memorandum T-1-202. If there are any titles on this list which are of interest to you, we would be happy to provide copies.

S.W. Ormrod
Director
Pesticides Division

This replaces Memorandum R-1-200 dated December 1, 1980
Distribution: PP, KK, JZ, KL, KN, KP, KQ, KV, PW, PX.

* Now the Pesticides Division, Plant Health and Plant Products Directorate.

R-1-200

MEMORANDA TO REGISTRANTS ISSUED BY THE PESTICIDES SECTION PLANT PRODUCTS AND QUARANTINE DIVISION, AGRICULTURE CANADA

R-1-200	List of Memoranda to Registrants (1/12/80)
R-1-8	Re-evaluation of Products Containing Cadmium (5/3/79)
R-1-68	Metric Conversion of Pesticide Labels (29/7/77)
R-1-71	Metric Conversion of Seed Treatments (26/10/77)
R-1-201	Re-evaluation of products containing 2,4-D, 2,4,5-T and fenoprop (29/08/80)
R-1-204	Re-evaluation of Fumigants (27/10/80)
R-1-205	Implementation of Product Specific Registration (24/12/80)
R-1-211	Guidelines for Pesticide Toxicology Data Requirements (30/10/81)
R-1-212	Re-evaluation of MCPA (4/11/81)

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH / DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE: October 27, 1980	K-1-204
	SECTION: PESTICIDES	
RE / OBJET: MEMORANDUM TO REGISTRANTS		

Re: Re-evaluation of Fumigants

The purpose of this Memorandum is to notify registrants that the regulatory status of the following fumigants will be subject to review during 1980-81, under the authority of Section 19 of the Regulations under the Pest Control Products Act:

Compound	Code
allyl alcohol	AAL
aluminum phosphide	ALP
carbon disulfide	CAD
chloropicrin	CPN
carbon tetrachloride	CTC
dazomet	DAZ
chlorinated C_3 hydrocarbons	DSF
1,3-dichloropropene	DSG
ethylene dibromide	EDB
ethylene dichloride	EDC
ethylene oxide	ETO
hydrogen cyanide	HCN
methyl bromide	MBR
methyl isothiocyanate	MIS
metam-sodium	MTM

Attached to this memorandum is a draft summarizing the label instructions and limitations acceptable for registration under the Pest Control Products Act for these fumigants. Registrants are asked to review this draft and verify that it is a complete and accurate summary of their registered label instructions.

If you wish to propose any corrections or revisions to this summary, or wish to have any additional uses for these products reviewed at this time, please give us your comments by December 29, 1980.

If any revisions are required in the regulatory status of these products as a result of this review, it is expected the date of implementation will be January 1, 1982. Registrants will be invited to comment on any proposed revisions in the regulatory status of these products before such changes are implemented.

Please address your comments to the Head, Technical Services Unit, Pesticides Section, Ottawa, Ontario K1A 0C6.

S.W. Ormrod
Associate Director
(Pesticides)
Plant Products and
Quarantine Division

Distribution: PPD-2, PCP-3,10,12, Registrants of products containing AAL, ALP, CAD, CPN, CTC, DAZ, DSF, DSG, EDB, EDC, ETO, HCN, MBR, MIS, MTM. Canadian Agricultural Chemicals Association, Canadian Chemical Producers Association, Canadian Pest Control Operators Association

ANNEX 2
TRADE MEMORANDA

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH	DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE August 31, 1981	T-1-200
		PESTICIDES DIVISION	

TRADE MEMORANDUM

RE: Revision of Trade Memoranda

The purpose of this memorandum is to provide registrants with an updated list of Trade Memoranda issued by the Pesticides Division of the Plant Products and Quarantine Directorate, with an alphabetical index to Trade Memoranda, and also with several new documents.

The following table shows the changes which should be made in your loose-leaf book of memoranda to bring it up to date:

Delete	Insert	Title	Comments
T-1-200 01/12/80	T-1-200 31/08/81	Revision of Memoranda	Updated
T-1-201 31/10/80	T-1-201 31/08/81	The Organization of the Pesticides Division	Changes in staff and in telephone extension numbers
T-1-202 enclosure	T-1-202 enclosure	Pesticides Division Information System	Updated to reflect availability of Compendium volumes
T-1-205 14/02/80	T-1-205 31/08/81	Regulatory Status of Pesticides for Aquatic Applications other than use in Swimming Pools or Industrial Water	Revised to include status of products used in farm, fish or fire ponds and dugouts.
T-1-206 02/04/80	T-1-206 31/08/81	Minor Uses of Pesticides	Updated
T-1-214 14/2/80	T-1-214 31/08/81	Antimicrobial Products Subject to the PCP Act and the Food & Drugs Act	Revised to reflect changes in application of statuatory responsibilities
	T-1-213 31/08/81	Aerial Application of Pesticides	Revised and reinstated

Delete	Insert	Title	Comments
-	T-1-233	Technical Grades of 2,4-D Registered under the Authority of the PCP Act.	new
-	T-1-234	Plant Growth Regulators	new

Copies of individual memoranda, or of this package of new and amended memorandum, may be obtained from: Ms. Maureen Thompson, Pesticides Division, Food Production and Inspection Branch, Agriculture Canada, Room 1105, K.W. Neatby Bldg., Ottawa K1A 0C6

S.W. Ormrod
Director
Pesticides Division
Plant Products and Quarantine Directorate

This replaces Memorandum T-1-200 dated December 1, 1980.

Distribution: PP, KK, JZ, KL, KN, KP, KQ, KR, KV, PW, PX.

Trade Memoranda Issued by the Pesticides Division, Plant Products and Quarantine Directorate, Agriculture Canada

T-1-200 Revision of Trade Memoranda. (31/08/81)

T-1-201 The Organization of the Pesticides Division. (31/08/81)

T-1-202 Pesticides Division Information System. (31/08/81)

T-1-203 Regulatory Status of Pesticides for Use in Forest and Woodlands Management and on Ornamentals. (31/10/80)

T-1-204 Regulatory Status of Pesticides for Use in Forest Management. (14/2/81)

T-1-205 Regulatory Status of Pesticides for Aquatic Applications other than Use in Swimming Pools or Industrial Water. (31/08/81)

T-1-206 Minor Uses of Pesticides. (31/08/81)

T-1-207 Products, other than Antimicrobials, Subject to both the Pest Contol Products Act and the Food and Drugs Act. (14/2/80)

T-1-208 Registration Requirements for Products Sold in Response to an Invitation to Tender. (14/2/80)

T-1-209 Registration Requirements for Electrical Devices for the Control of Insect Pests. (14/2/80)

T-1-210 Color Standard for Cereal Seed Products. (14/2/80)

T-1-211 Biological Performance Standard for Personal Insect Repellents. (14/2/80)

T-1-212 Pesticides - Data Handling Procedures. (8/9/80)

T-1-213 Aerial Application of Pesticides. (31/08/81)

T-1-214 Antimicrobials Products Subject to the Pest Control Products Act and the Food and Drugs Act. (31/08/81)

T-1-215 Efficacy and Toxicity Information on Antimicrobial Products. (14/2/80)

T-1-216 Research Permit Requests. (14/2/80)

T-1-217 Classification of Beans on Labels and in Use Standards. (14/2/80)

T-1-218 Pest Control Products Containing Vinyl Chloride. (14/2/80)

T-1-219 Biological Performance Standards for Aerosols and Pressurized Space Sprays. (14/2/80)

T-1-220 Labelling of Treated Seed. (15/2/80)

T-1-221 Requirements for Registration of Dust Bag/Insecticide Combinations. (14/2/80)

T-1-222 Acceptable Substitutes for Pyrethrins. (31/10/80)

T-1-223 Samples and Information Required for New Active Ingredients and New Sources of Technical Material. (8/9/80)

T-1-225 Registration Requirements for Adjuvant Products. (14/2/80)

T-1-227 Regulatory Status of Discontinued Products. (29/2/80)

T-1-228 Common and Chemical Names for Pest Control Chemicals. (10/7/80)

T-1-229 Changes in the Regulatory Status of the Chlorophenols. (31/10/80)

T-1-230 Amendments to the Pest Control Regulations. (31/10/80)

T-1-231 Changes in the Regulatory Status of Toxaphene. (31/10/80)

T-1-232 Introduction of Product Specific Registration. (8/9/80)

T-1-233 Technical Grades of 2,4-D Registered under the Authority of the Pest Control Products Act. (28/08/81)

T-1-234 Plant Growth Regulators (03/06/81)

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Toxaphene - Changes in Regulatory Status T-1-231

Vinyl Chloride - Regulatory Status T-1-218

Water, Pesticides for Use In - Classification T-1-205

Woodland Management, Pesticides for - Classification T-1-203

T-1-200 to T-1-234

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH / DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE: November 28, 1980	T-1-229
	SECTION: PESTICIDES	

RE / OBJET

CHANGES IN THE REGULATORY STATUS OF THE CHLOROPHENOLS

Products containing trichlorophenol, tetrachlorophenol and pentachlorophenol and their salts have been registered for use in Canada since 1949. As part of an on-going review of older pesticides, Memorandum R-1-79, dated August 7, 1979, notified registrants that the chlorophenols were to undergo a re-evaluation. Memorandum R-1-79, dated September 24, 1979, requested the comments of registrants on proposed revisions in the regulatory status of these compounds.

Information available in the literature suggests that potential occupational, bystander, human and animal health hazards may be associated with certain registered uses of chlorophenol products. Hazards have been ascribed to the dibenzodioxins, dibenzofurans and other by- products present in technical chlorophenols as microcontaminants.

In view of these concerns, Agriculture Canada announces the following revisions to the use standards, effective January 1, 1981:

1) Suspension of chlorophenol products carrying label instructions for use as wood preservatives and/or wood stains for INTERIOR home use;

2) Suspension of products containing sodium pentachlorophenate (SPC) for use as fungicides in mushroom houses and on tools for mushroom culture;

3) Suspension of products containing pentachlorophenol for use as wood preservatives on wooden food containers and on horticultural lumber, e.g. seed flats, stakes, greenhouse lumber, etc;

4) Suspension of products containing pentachlorophenol (PCP) and carrying label instructions for use as wood preservatives on above-ground interior woodwork of farm buildings, e.g. dry locations such as walls, floors, bins, feed troughs, silos, stalls, chicken roosts, etc. It is recommended that pentachlorophenol-treated wood be used on the farm only where the wood is in ground contact, e.g. fence posts, support poles, foundation supports, and the bottom six inches of stall skirt boards;

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5) Suspension of all chlorophenol products carrying label instructions for use as microbiocides in curing hides;

6) Suspension of products labelled for use as herbicides and soil sterilants, except those labelled for destruction of moss on roofs;

7) Suspension of products containing the chlorophenols and their sodium salts for use as slimicides in pulp and paper mill operations;

8) Suspension of all DOMESTIC class products for application by SPRAY methods.

The use standards for the chlorophenols will be subject to re-review as additional scientific data becomes available. Your attention is directed to new FIRST AID statements, limitations and cautions outlined in the use standards.

Two use areas (material preservation and sapstain inhibition) will receive on-going evaluation during the next registration period. For those chlorophenols and their derivatives used as additives to textiles, the following limitation is to be added to product labels:

> "Do not incorporate into materials of which end use will result in prolonged direct skin contact e.g. life jackets, sleeping bags, sports equipment."

This notice is issued under the authority of the Pest Control Products Act and Section 20 of the Regulations. Registrants should take note of Section 22 of the Regulations under the Pest Control Products Act for an understanding of the regulatory effects of a notice of suspension.

Use patterns for the chlorophenols summarizing all of the label instructions acceptable for registration under the Pest Control Products Act may be obtained from the Chief, Technical Services Unit, Pesticides Section, Agriculture Canada, K.W. Neatby Building, Ottawa, K1A 0C6.

Registrants may amend their registration by submitting applications for amendment, including draft labels, in compliance with this memorandum. Applications for new registrations should include draft labels in compliance with this memorandum.

S.W. Ormrod
Associate Director (Pesticides)
Plant Products and Quarantine Division

This replaces Memorandum R-1-79 dated September 24, 1979.

Distribution: Registrants of chlorophenols; PPD-2; PCP-3; PCP-7 PCP-10; PCP-12.

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH	DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE: September 8, 1980	T-1-232
		SECTION: PESTICIDES	
RE: OBJET: TRADE MEMORANDUM			

Re: Product Specific Registration (PSR) Policy - Pesticides

In accordance with new Departmental Policy established by the Deputy Minister, pesticide registration procedures are now being implemented that are more product specific, rather than generic in nature. These changes will focus initially on the active ingredient or basic chemical, as well as on a more detailed consideration of the formulated product, per se. This initiative is an important first step towards tightening pesticide regulation controls and operational procedures in the interest of greater assurance of the safety and effectiveness of every product registered under the Pest Control Products Act.

The following paragraphs outline initial operational procedures that have been put in place to implement this new policy:

1. Status of products already on the market and properly documented new active ingredients will not be directly affected.

2. Most applications, with the major exception of compounds supported by Industrial Biotest (IBT) data and those under re-evaluation, received prior to September 8, 1980 will be handled via the previous generic registration policy. Applications received prior to September 8 that involve new sources of a previously registered active ingredient require special consideration; we are currently developing a proper procedure to accommodate these situations.

3. For applications received after September 8, 1980, product specific registration (PSR) will at least involve "tying" each individual submission to a basic producer via a manufacturing specification (T-1-223), a data base index (T-1-212) and written confirmation from the basic manufacturer that his specific product and process is the ultimate source of the active ingredient. In many situations, particularly those involving older compounds and certain antimicrobial products, this basic requirement will not suffice since there is no complete data base on file that can be cited as directly associated with the individual manufacturer or basic supplier. In these cases, a full data submission will be required. Subsequent applications will not be

granted registration unless they can provide or cite a comparable, adequate data package.

In summary, applications made after September 8, 1980 will fall into four categories:

I A complete and current data package will be required for new products or label expansions that cannot be directly associated by the applicant, or on his behalf by the basic supplier, with an adequate data base already on file that relates specifically to the basic supplier's technical ingredient and manufacturing process.

II In situations where IBT is not implicated and a more modern and adequate data package exists the PSR requirement may be met by a minimum of:

1. "Tying" the specific submission to a basic producer via a manufacturing specification (T-1-223) and data base index (T-1-212) provided either by the formulator or his basic supplier.

2. Written confirmation from the basic manufacturer which verifies his specific product and process as the ultimate source of the active ingredient.

III No new products or label expansions will be accepted for IBT chemicals or compounds under re-evaluation without written agreement from Health and Welfare Canada.

IV Temporary registrations will not be extended or advanced to full registration status for any situations covered by category I and compounds supported by IBT data without written agreement from Health and Welfare Canada.

S.W. Ormrod
Associate Director (Pesticides)
Plant Products and Quarantine Division

Distribution: PPD-2, PCP-1,2,3,4,5,6,8,10,12

ANNEX 3
REPORT OF NEW REGISTRATION

Agriculture Canada

FOOD PRODUCTION AND INSPECTION BRANCH	DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE April 21, 1982	CSL RNR-82-1
		PESTICIDES DIVISION	

REPORT OF NEW REGISTRATION

RE: 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl) aminocarbonyl] benzenesulfonamide

A new herbicide has been registered under the Pest Control Products Act by DuPont Canada Inc., Mississauga, Ontario. GLEAN Weed Killer Dry Flowable, Registration Number 17245, is a wettable granular formulation containing 75% w/w of the active ingredient 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)aminocarbonyl] benzenesulfonamide. This product is classified as COMMERCIAL, and it is registered on a temporary basis pending review of additional data. It is registered for use on wheat and barley in the Prairie provinces as a post-emergence treatment for the control of certain broadleaved weeds.

Common Name: chlorsulfuron (proposed)

Chemical Name: 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl) aminocarbonyl] benzenesulfonamide.

Physical and Chemical Properties: The technical material has a minimum purity of 94%. The pure chemical is a white crystalline solid, with a molecular weight of 357.8, a vapor pressure of 4.6×10^{-7} mm Hg at 25°C, and a melting point of 174-178°C. It is non-flammable. Solubility (wt/wt) in organic solvents at 22°C is: hexane, 10 ppm; toluene, 0.3%; methanol, 1.8%; acetone, 7.0%; methyl chloride, 7.7%; N,N-dimethylformamide, 27.3%. It is slightly soluble in water (125 ppm at 22°C). The octanol/water partition ratio is approximately 13.

Toxicity:

A. Technical chlorsulfuron:

Acute oral LD_{50},	male rats	5545 mg/kg
	female rats	6293 mg/kg
	guinea pigs	1363 mg/kg
	dogs	>2500 mg/kg
Acute dermal LD_{50},	rabbits	3400 mg/kg
Acute inhalation LC_{50},	rats	> 5.9 mg/L

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Chronic Toxicity:

In a 6-month dog feeding study at concentrations up to 2500 ppm in the diet, no dose-related adverse effects were noted. When rats and mice were fed a diet containing this compound up to 500 ppm for 2 years, no significant effects on health or reproduction were produced. In various studies with this compound no teratogenic, mutagenic or oncogenic effect was observed.

B. Formulated product (75% chlorsulfuron)

Acute oral LD_{50}, male rats	4147 mg/kg
female rats	2493 mg/kg
Acute dermal LD_{50}, rabbits	> 2000 mg/kg
Primary skin irritation, rabbits	very mild irritant
Eye irritation, rabbit	mild irritant

Environmental Data:

Technical material:

Acute oral LD_{50}, bobwhite quail	> 5000 mg/kg
mallard ducks	> 5000 mg/kg
Eight day dietary LC_{50}, mallard ducklings	> 5000 mg/kg
Ninety-six hour LC_{50}, bluegill sunfish	> 300 ppm
rainbow trout	> 250 ppm
fathead minnow	> 300 ppm
catfish	> 50 ppm
Forty-eight hour LC_{50}, Daphnia magna	370 ppm

Soil persistence studies are continuing. Primary results indicate that the half-life of this compound is approximately 1-3 months under various soil conditions.

Residues:

No tolerance has been requested or established. The chemical is registered for use on the food crops on a negligible residue basis since the use is not considered to produce residues in the treated crops.

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Registered Uses:

This product is registered for use on spring wheat and barley. At the present time, it is for use in the Prairie provinces only. It is applied post-emergence when the crop is in the two-leaf to flag leaf (shot blade) stage and the weeds are small and actively growing. A spray adjuvant must be used to obtain maximum weed control. The application rate is 11.25 g active ingredient per hectare for the control of cleavers, green smartweed, hemp-nettle, lady's-thumb, lamb's-quarters, redroot pigweed, stinkweed, volunteer rapeseed, wild mustard, and 22.5 g per hectare for the control of Canada thistle, chickweed, cow cockle, kochia and Russian thistle. The product should not be used on sandy soils. Since residues in the soil may injure sensitive crops, label precautions must be followed carefully to avoid damage to rotational crops.

Cautions:

Keep out of reach of children. Avoid breathing spray mist. Avoid contact with skin, eyes and clothing. Do not contaminate water, food or feed by storage or disposal.

First Aid:

In the event of accidental poisioning, consult a physician.

F.Y. Chang
Pesticides Division

Distribution: RG(C), RG(B), PP, PW, N5, KP, KQ, KR, PX